

CLAIMS

1. An aqueous dispersion, comprising
5 at least one polymer (a), comprising at least one water dispersible site per molecule and one or more functional groups (f) reactive with crosslinking agent (b),
at least one crosslinking agent (b) comprising one or more blocked functional groups (f_b) that are reactive with polymer (a) after unblocking, wherein crosslinking agent (b) has a T_g of from 40 to 70°C/105 to 158°F and is a solid at 23.9°C/75°F when at 100% solids,
10 wherein crosslinking agent (b) is melt mixed into acrylic polymer (a) to provide a first dispersion and said first dispersion is emulsified in water to provide an aqueous dispersion.
2. The aqueous dispersion of claim 1 wherein the at least one water dispersible group
15 of polymer (a) is a nonionic group.
3. The aqueous dispersion of claim 1 wherein the at least one water dispersible group of polymer (a) is a salted group resulting from the neutralization of a saltable group with at least one salting agent.
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4. The aqueous dispersion of claim 3 wherein the salted group is a cationic group resulting from the neutralization of a basic group with an acidic salting agent.
5. The aqueous dispersion of claim 3 wherein the salted group is an anionic group
25 resulting from the neutralization of an acidic group with a basic salting agent.
6. The aqueous dispersion of claim 1 which is electrodepositable.
7. The aqueous dispersion of claim 1 wherein polymer (a) is at least one polymer from
30 the group of polyurethane polymers, acrylic polymers, epoxy based polymers and mixtures thereof.

8. The aqueous dispersion of claim 7 wherein polymer (a) is an acrylic polymer.

9. The aqueous dispersion of claim 8 having no more than 5% by weight of an epoxy
5 functional polymer, based on the total nonvolatile weight of polymer (a) and crosslinking agent (b).

10. The aqueous dispersion of claim 1 having an average particle size of from 0.05 to 0.50 microns.

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11. The aqueous dispersion of claim 3 wherein polymer (a) had from 0.2 to 3.0 mEQ
sactable sites/gram NV polymer (a) before neutralization.

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12. The aqueous dispersion of claim 11 wherein polymer (a) had from 0.6 to 0.9 mEQ
sactable sites/gram NV polymer (a).

13. The aqueous dispersion of claim 11 wherein from 20 to 100 % of the sactable sites
on polymer (a) have been salted, based on the total number of sactable sites of polymer (a).

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14. The aqueous dispersion of claim 13 wherein from 40 to 80 % of the sactable sites on
polymer (a) have been salted, based on the total number of sactable sites of polymer (a).

15. The aqueous dispersion of claim 14 wherein from 55 to 65 % of the sactable sites on
polymer (a) have been salted, based on the total number of sactable sites of polymer (a).

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16. The aqueous dispersion of claim 3 wherein the salted polymer (a) has from 0.5 to 8.0
mEQ OH/gram NV of polymer (a).

17. The aqueous dispersion of claim 3 wherein the salted polymer (a) has from 1.5 to 6.0
30 mEQ OH/gram NV of polymer (a).

18. The aqueous dispersion of claim 17 wherein the salted polymer (a) has from 2.5 to 4.5 mEQ OH/gram NV of polymer (a).

19. The aqueous dispersion of claim A3 wherein polymer (a) had from 0.6 to 0.9 mEQ
5 saltable sites/gram NV polymer (a), from 2.5 to 4.5 mEQ OH/ grams NV polymer (a) and
from 55 to 65% of the saltable sites have been neutralized.

20. The aqueous dispersion of claim 1 having a corrosion resistance of no more than
3mm scribe creep, as tested per GM9511 P and evaluated per GM9102.

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21. The aqueous dispersion of claim 1 having a % gloss retention of at least 80% after
400 hours exposure to weatherometer per SAE J1960.

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22. The aqueous dispersion of claim 1 having a % gloss retention of at least 80% after
100 hours exposure to QUV per SAEJ2020.

23. The aqueous dispersion of claim 21 having a % gloss retention of at least 95% after
400 hours exposure to weatherometer per SAE J1960.

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24. The aqueous dispersion of claim 22 having a % gloss retention of at least 85% after
100 hours exposure to QUV per SAEJ2020.

25. The aqueous dispersion of claim 1 having an average micelle particle size of from
0.05 to 0.50 microns.

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26. The aqueous dispersion of claim 1 comprising from 50 to 75 % by weight of water,
based on the total nonvolatile weight of the aqueous dispersion.

27. The aqueous dispersion of claim 8 comprising from 75 to 95% by weight of water,
30 based on the total nonvolatile weight of the aqueous dispersion.

28. The aqueous dispersion of claim 9 comprising from 80 to 90% by weight of water, based on the total nonvolatile weight of the aqueous dispersion.

29. An aqueous electrodepositable primer comprising the aqueous dispersion of claim 1 and at least 50% by weight of water, based on the total weight of the aqueous electrodepositable primer.

30. An aqueous electrodepositable primer, comprising
an acrylic polymer (a) comprising one or more salted sites per molecule and one or more functional groups (f) reactive with crosslinking agent (b),
at least one crosslinking agent (b) comprising one or more blocked functional groups (f_b) that are reactive with acrylic polymer (a) after unblocking, wherein crosslinking agent (b) has a T_g of from 40 to 70°C/105 to 158°F, and is a solid at 23.9°C/75°F when at 100% solids, and

at least 50% by weight of water, based on the total weight of the aqueous electrodepositable primer,

wherein acrylic polymer (a) disperses crosslinking agent (b) into the water so as to provide an aqueous electrodepositable primer.

31. The aqueous electrodepositable primer of claim 30 having a corrosion resistance of no more than 3mm scribe creep as tested per GM9511 and evaluated per GM 9102, and a % 60° gloss retention of at least 80% after 400 hours exposure to weatherometer per SAE J1960.

32. The aqueous electrodepositable primer of claim 30 having no more than 5 % by weight of an epoxy based resin having aromatic ring moieties, based on the total weight nonvolatile of the aqueous electrodepositable dispersion.

33. The aqueous electrodepositable primer of claim 30 which is free of lead.

34. The aqueous electrodepositable primer of claim 31 which is free of lead containing pigments.

34. The aqueous electrodepositable primer of claim 30 having a % gloss retention of at least 90% after 400 hours exposure to weatherometer per SAE J1960.

35. The aqueous electrodepositable primer of claim 31 having a % 60° gloss retention of at least 95% after 100 hours exposure to QUV per SAEJ2020.

36. The aqueous electrodepositable primer of claim 31 having a VOC of less than 3.0.

37. The aqueous electrodepositable primer of claim 31 having a VOC of less than 1.0.

38. The aqueous electrodepositable primer of claim 32 having a VOC of from 0.1 to 0.9.

39. The aqueous electrodepositable primer of claim 30 comprising from 1.00 to 20.00% by weight of the acrylic polymer (a), based on the total weight of the aqueous electrodepositable primer.

40. The aqueous electrodepositable primer of claim 30 comprising from 0.50 to 15.00% by weight of the crosslinking agent (b), based on the total weight of the aqueous electrodepositable primer.

41. An aqueous electrodepositable primer, comprising

from 1.0 to 20.0% by weight nonvolatile of an acrylic polymer (a), based on the total nonvolatile weight of the aqueous electrodepositable primer, said acrylic polymer (a) having a plurality of cationic salted sites and from 1.5 to 6.0 meq of hydroxyl per gram of nonvolatile acrylic polymer (a),

at least one crosslinking agent (b) comprising one or more blocked functional groups

(f_b) that are reactive with acrylic polymer (a) after unblocking, wherein crosslinking agent

(b) has a T_g of from 40 to 70°C/105 to 158°F, and is a solid at 23.9°C/75°F when at 100% solids,

one or more pigments which are free of lead-containing pigments, and

at least 70% by weight of water, based on the total weight of the aqueous

5 electrodepositable primer,

wherein cationic acrylic polymer (a) disperses crosslinking agent (b) into the water and the aqueous electrodepositable primer provides cured electrodeposited films having a corrosion resistance of no more than 3mm scribe creep as tested per GM9511 and evaluated per GM 9102, and a 60 degree gloss retention of at least 80% after 400 hours exposure to

10 weatherometer per SAE J1960.

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